

STATE HEALTH REGISTRY OF IOWA

2011

# Cancer in Iowa



In 2011, an estimated 6,300 Iowans will die from cancer, 16 times the number caused by auto fatalities. Cancer and heart disease are the leading causes of death in Iowa. These projections are based upon mortality data the State Health Registry of Iowa receives from the Iowa Department of Public Health. The Registry has been recording the occurrence of cancer in Iowa since 1973, and is one of fourteen population-based registries and three supplementary registries nationwide providing data to the National Cancer Institute. With *2011 Cancer in Iowa* the Registry makes a general report to the public on the status of cancer. This report will focus on:

- a description of the Registry and its goals;
- cancer estimates for 2011;
- a special section on colorectal cancer;
- brief summaries of recent/ongoing research projects;
- a selected list of publications from 2010.



# The State Health Registry of Iowa

## **Cancer is a reportable disease as stated in the Iowa Administrative Code.**

Cancer data are collected by the State Health Registry of Iowa, located at The University of Iowa in the College of Public Health's Department of Epidemiology. The staff includes more than 50 people. Half of them, situated throughout the state, regularly visit hospitals, clinics, and medical laboratories in Iowa and neighboring states to collect cancer data. A follow-up program tracks more than 99 percent of the cancer survivors diagnosed since 1973. This program provides regular updates for follow-up and survival. The Registry maintains the confidentiality of the patients, physicians, and hospitals providing data.

In 2011 data will be collected on an estimated 16,500 new cancers among Iowa residents. In situ cases of bladder cancer are included in the estimates for bladder cancer, to be in agreement with the definition of reportable cases of the Surveillance, Epidemiology, and End Results (SEER) Program of the National Cancer Institute.

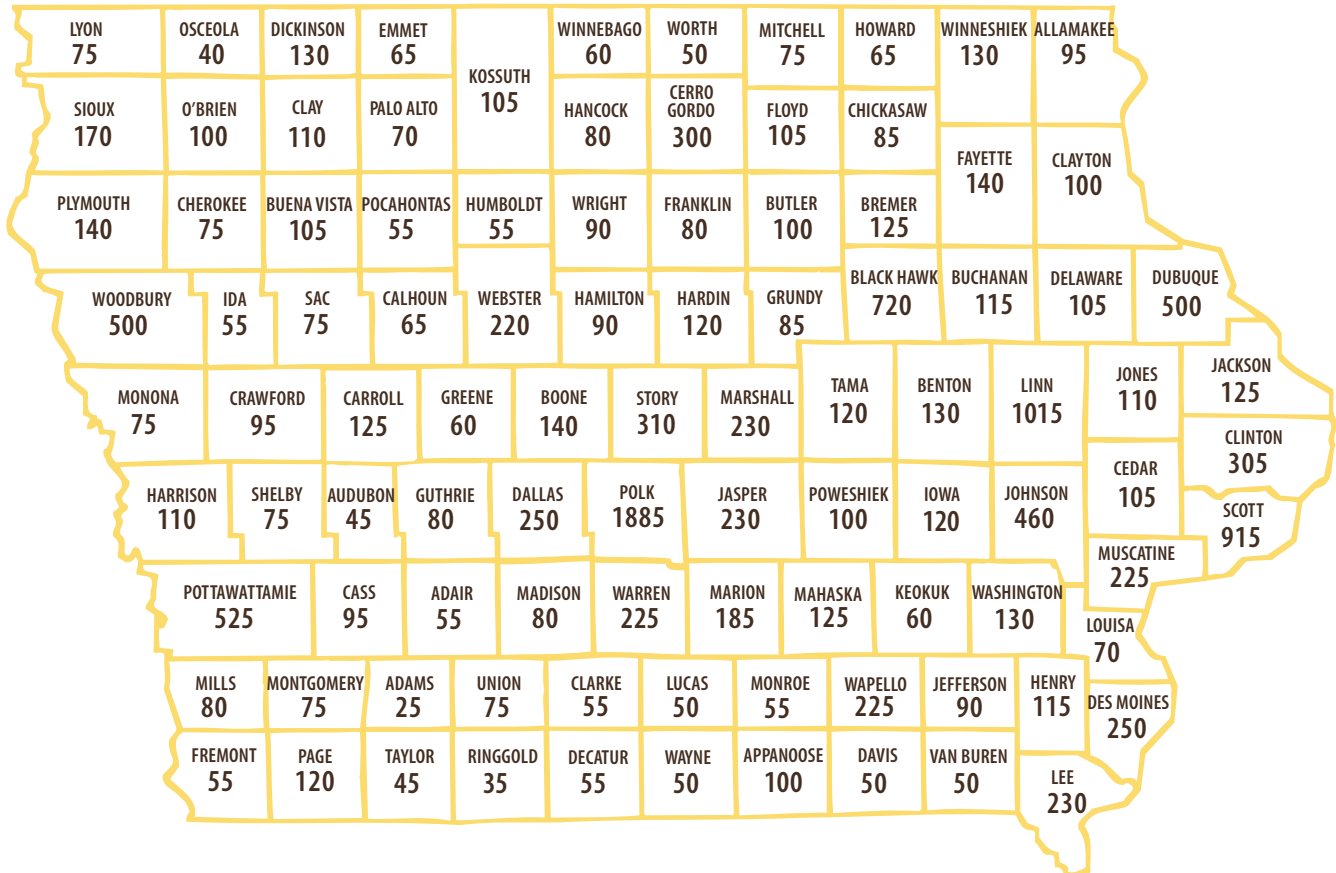
Since 1973 the Iowa Registry has been funded by the SEER Program of the National Cancer Institute. Iowa represents rural and Midwestern populations and provides data included in many National Cancer Institute publications. Beginning in 1990 about 5-10 percent of the Registry's annual operating budget has been provided by the state of Iowa. Beginning in 2003, the University of Iowa has also been providing cost-sharing funds. The Registry also receives funding through grants and contracts with university, state, and national researchers investigating cancer-related topics.

The goals of the Registry are to:

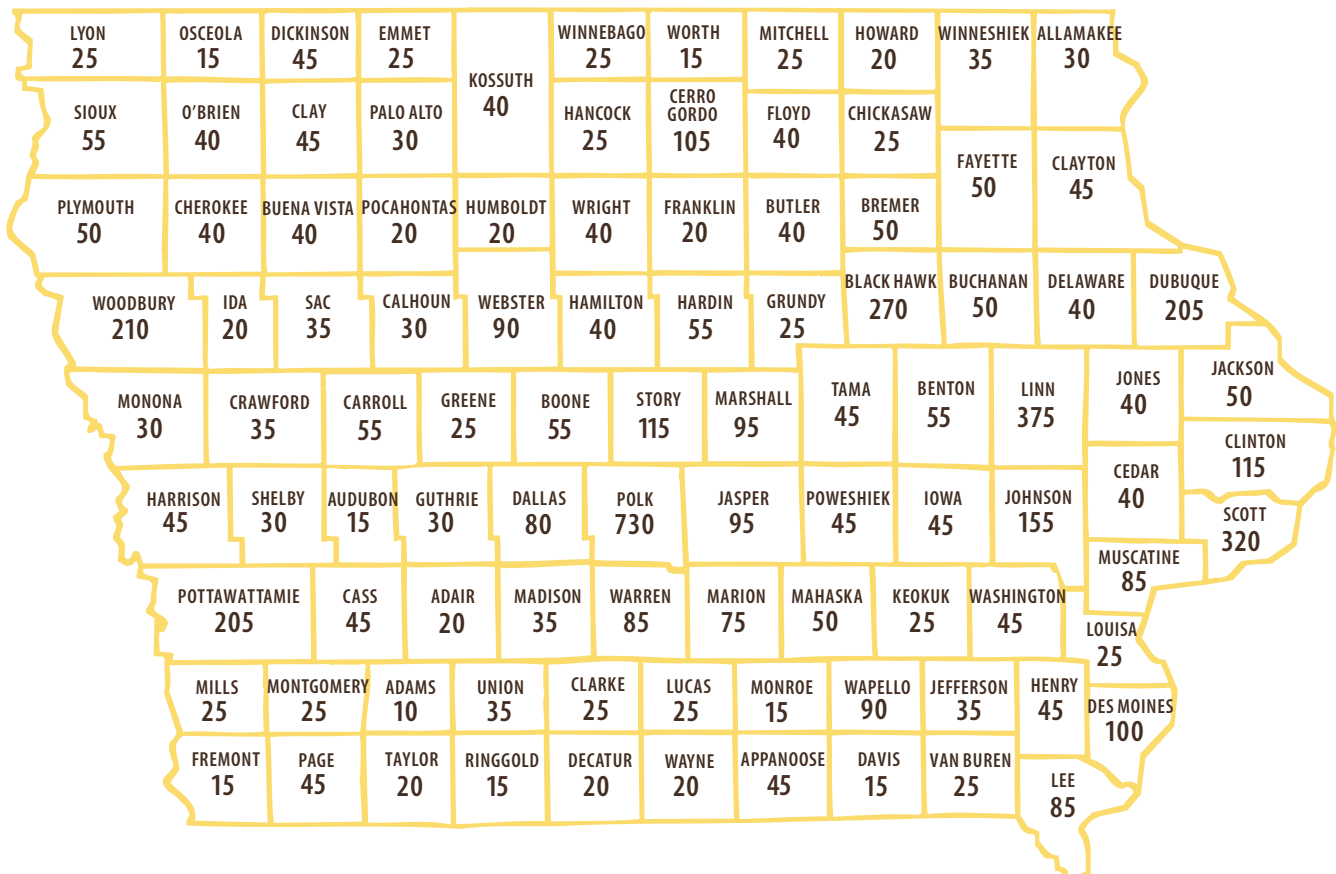
- assemble and report measurements of cancer incidence, survival and mortality among Iowans;
- provide information on changes over time in the extent of disease at diagnosis, therapy, and patient survival;
- promote and conduct studies designed to identify factors relating to cancer etiology, prevention and control;
- respond to requests from individuals and organizations in the state of Iowa for cancer data and analyses;
- provide data and expertise for cancer research activities and educational opportunities.

# Cancer Projections for 2011

## Estimated Number of New Cancers in Iowa for 2011



## Estimated Number of Cancer Deaths in Iowa for 2011



## Top 10 Types of Cancer in Iowa Estimated for 2011

### New Cancers in Females

Type	# of Cancers	% of Total
Breast	2160	27.0
Lung	1070	13.4
Colon & Rectum	880	11.0
Uterus	520	6.5
Non-Hodgkin Lymphoma	370	4.6
Skin Melanoma	300	3.8
Thyroid	260	3.2
Ovary	250	3.1
Kidney & Renal Pelvis	230	2.9
Leukemia	210	2.6
All Others	1750	21.9
<b>Total</b>	<b>8000</b>	

### New Cancers in Males

Type	# of Cancers	% of Total
Prostate	2150	25.3
Lung	1250	14.7
Colon & Rectum	860	10.1
Bladder (invasive and noninvasive)	620	7.3
Non-Hodgkin Lymphoma	420	4.9
Skin Melanoma	420	4.9
Kidney & Renal Pelvis	360	4.2
Leukemia	250	3.0
Oral Cavity	230	2.7
Pancreas	210	2.5
All Others	1730	20.4
<b>Total</b>	<b>8500</b>	

### Cancer Deaths in Females

Type	# of Cancers	% of Total
Lung	800	25.8
Breast	430	13.9
Colon & Rectum	320	10.3
Pancreas	190	6.1
Ovary	180	5.8
Non-Hodgkin Lymphoma	120	3.9
Leukemia	110	3.5
Uterus	100	3.2
Brain	80	2.6
Kidney & Renal Pelvis	70	2.3
All Others	700	22.6
<b>Total</b>	<b>3100</b>	

### Cancer Deaths in Males

Type	# of Cancers	% of Total
Lung	970	30.3
Prostate	330	10.3
Colon & Rectum	300	9.4
Pancreas	180	5.6
Leukemia	150	4.7
Bladder	130	4.1
Esophagus	130	4.1
Non-Hodgkin Lymphoma	130	4.1
Kidney & Renal Pelvis	110	3.4
Brain	100	3.1
All Others	670	20.9
<b>Total</b>	<b>3200</b>	



## Colorectal Cancer

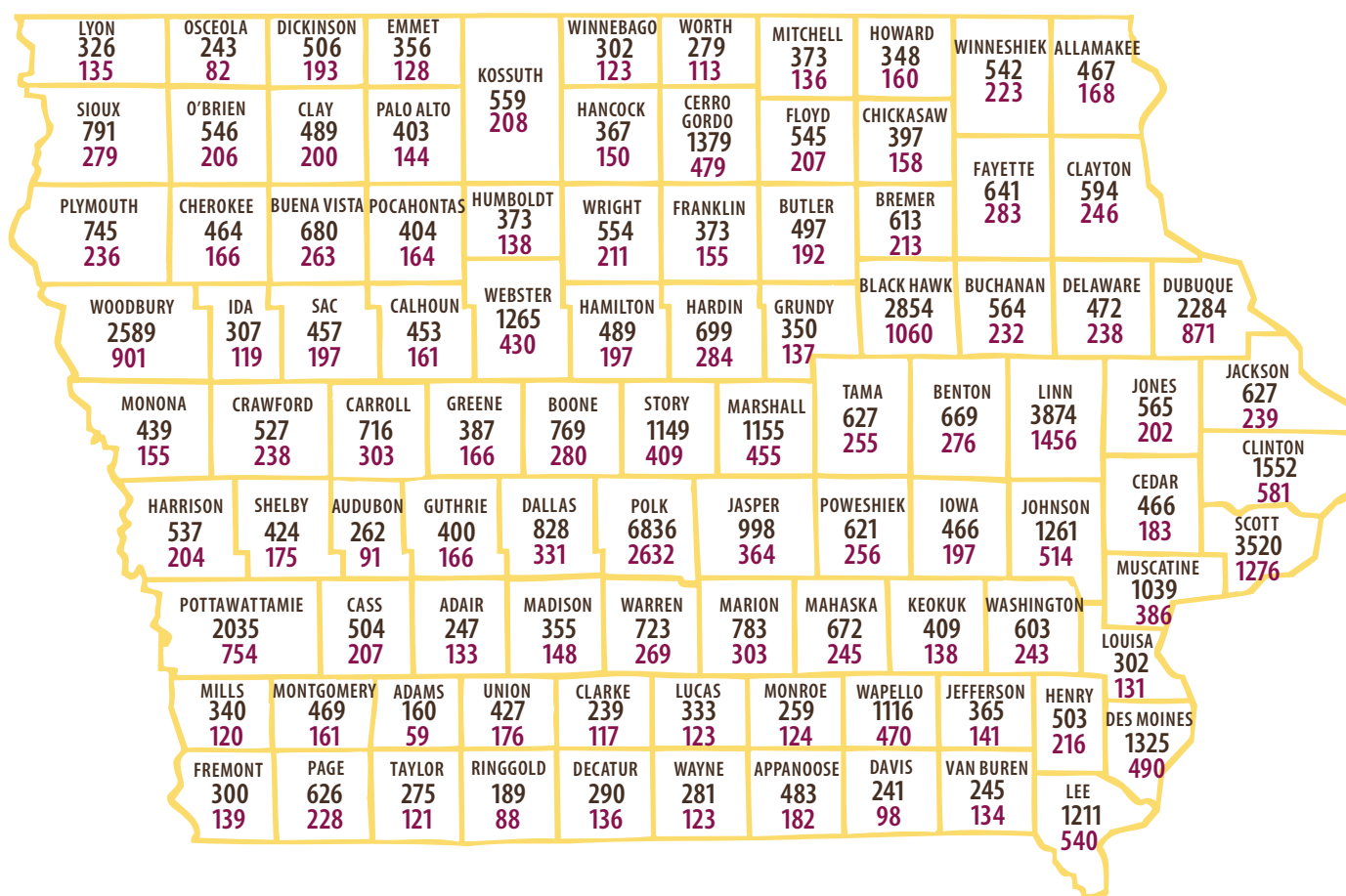
Between 1973 and 2008, cancer of the colon and rectum (colorectal cancer) was the most common malignant (invasive) cancer diagnosed among Iowans and the second leading cause of cancer death. There were 71,880 malignant and 3,083 *in situ* (confined to inner layer of wall of colon or rectum) colorectal cancers (total=74,963) diagnosed during this period affecting residents in every county in the state (Figure 1). Of these, 95% were diagnosed in Iowans 50 years of age and older. The number of colorectal cancers has changed during this period from an average of 1,840 per year in the 1970s, increasing to 2,180 in the 1980s, peaking at 2,210 in the 1990s, and

declining to 2,020 in the last decade. The female (n=39,049) to male (n=35,914) ratio has been 1.09 to 1.0.

There were 28,933 deaths due to colorectal cancer (CRC) in Iowa for the years 1973-2008 (Figure 1). The average annual number of deaths due to CRC has declined over this period from 875 per year in the 1970s and 1980s, to 790 in the 1990s, to 685 in the 2000s. The female (n=15,299) to male (n=13,634) ratio for CRC deaths has been 1.12 to 1.0.

Another way to assess the burden of CRC is to calculate rates. These are a better reflection of the disease burden because they account for the

**Figure 1. Newly diagnosed *in situ* and malignant colorectal cancers and cancer deaths, Iowa, 1973-2008**



**Brown numbers:** newly diagnosed *in situ* and malignant colorectal cancers

**Magenta numbers:** colorectal cancer deaths

population at risk. Table 1 shows that new cases of in situ and malignant CRC (incidence) rates have declined over the past two decades for both males and females, those 50 years of age and older, white and black racial groups, and groupings of Iowa counties from the most rural to the most urban. Comparing the 1980 decade with the most recent decade, the statewide incidence rates have declined 18%. This level of decline has been seen in every group shown in Table 1 except those diagnosed under age 50 years, people living in non-MSA counties, and lowans of racial groups other than white or black where the average annual number of new cancers is small and the rates unstable.

**African Americans have higher colorectal cancer incidence and mortality rates than whites or other races in Iowa and in the United States.**

**Table 1. *In situ* and malignant colorectal cancer incidence rates\* (average annual number of cancers) by time period and selected characteristics, Iowa, 1973-2008**

Characteristic	Time Period				% Reduction 1980s vs. 2000s
	1973-1979	1980-1989	1990-1999	2000-2008	
Entire state	65.1 (1,840)	71.6 (2,180)	67.4 (2,206)	58.7 (2,024)	18.0%
Gender					
Male	72.9 (860)	82.7 (1,025)	80.2 (1,070)	67.8 (994)	18.0%
Female	59.7 (981)	64.1 (1,155)	58.2 (1,136)	51.3 (1,031)	20.0%
Age at diagnosis in years					
0-49	6.8 (99)	6.4 (95)	5.5 (103)	6.6 (134)	-3.1%
50-59	81.4 (249)	86.0 (239)	76.6 (214)	67.4 (250)	21.6%
60-64	151.5 (198)	178.8 (236)	165.7 (200)	134.0 (175)	25.1%
65+	357.8 (1,295)	399.4 (1,610)	384.0 (1,689)	326.7 (1,466)	18.2%
Race					
White	65.1 (1,824)	71.6 (2,157)	67.4 (2,179)	58.6 (1,982)	18.2%
Black	75.0 (15)	85.6 (21)	74.8 (21)	69.5 (26)	18.8%
Other	16.8 (1)	19.9 (2)	56.3 (6)	32.0 (9)	-61.8%
Urban/Rural**					
< 10,000	58.1 (160)	69.1 (197)	68.5 (194)	62.1 (165)	10.1%
10,000 - 20,000	62.9 (445)	69.0 (517)	67.3 (520)	61.3 (467)	11.2%
> 20,000	66.9 (463)	73.5 (541)	70.2 (542)	60.7 (481)	17.4%
MSA#	67.2 (773)	72.8 (926)	65.9 (951)	56.1 (912)	22.9%

\* Rates are per 100,000 population, include in situ and malignant, and age-adjusted to the 2000 US standard population

\*\* Urban/rural county average population groupings were obtained from the 2009 Iowa Health Fact Book (see <http://www.public-health.uiowa.edu/factbook/>)

# Metropolitan statistical area (MSA) consists of one or more counties that contain a city of 50,000 or more residents

**Table 2. Colorectal cancer mortality rates\* (average annual number of deaths) by time period and selected characteristics, Iowa, 1973-2008**

Characteristic	Time Period				% Reduction 1980s vs. 2000s
	1973-1979	1980-1989	1990-1999	2000-2008	
Entire state	31.0 (873)	28.5 (874)	23.7 (792)	19.1 (684)	33.0%
Gender					
Male	36.1 (412)	33.0 (401)	29.0 (378)	22.7 (329)	31.2%
Female	27.8 (461)	25.5 (473)	20.2 (414)	16.3 (356)	36.1%
Age at diagnosis in years					
0-49	2.7 (39)	2.2 (32)	1.4 (27)	1.3 (26)	40.9%
50-59	31.8 (97)	29.5 (82)	22.3 (62)	16.9 (63)	42.7%
60-64	62.6 (82)	62.0 (82)	51.9 (63)	37.2 (49)	40.0%
65+	182.9 (655)	168.3 (678)	143.9 (641)	117.3 (547)	30.3%
Race					
White	31.1 (866)	28.5 (865)	23.6 (781)	19.1 (673)	33.0%
Black	30.7 (6)	37.2 (9)	31.0 (8)	26.6 (9)	28.5%
Other	3.0 (0.1)	7.0 (0.6)	23.2 (2)	9.7 (2)	-38.6%
Urban/Rural**					
< 10,000	31.5 (87)	28.8 (84)	24.9 (74)	20.8 (59)	27.8%
10,000 - 20,000	28.8 (204)	28.2 (215)	24.0 (192)	20.4 (166)	27.7%
> 20,000	32.2 (221)	28.3 (211)	24.6 (194)	19.4 (160)	31.4%
MSA#	31.7 (360)	28.8 (364)	22.9 (333)	18.1 (299)	37.2%

\* Rates are per 100,000 population and age-adjusted to the 2000 US standard population

\*\* Urban/rural county average population groupings were obtained from the 2009 Iowa Health Fact Book (see <http://www.public-health.uiowa.edu/factbook/>)

# Metropolitan statistical area (MSA) consists of one or more counties that contain a city of 50,000 or more residents

Table 2 shows that death (mortality) rates due to CRC have been similar to the incidence rate findings. Comparing the 1980 decade with the most recent decade, the statewide mortality rates have declined over 30%. This level of decline has been seen in every group shown in Table 2 except people living in counties with average populations < 20,000, and Iowans of racial groups other than white or black where the average annual number of CRC deaths is small and the rates unstable.

Screening or early detection and treatment is a key way to reduce incidence and death from CRC. Incidence can be reduced through the removal of polyps, which are premalignant lesions. Staging is performed by health care providers to determine how far a cancer has spread. Early stage colorectal cancers are confined to the wall of the colon or rectum and can be treated by surgical removal resulting in a cure from this disease. In late stage CRC the disease

**Iowa is making progress in decreasing the health burden of colorectal cancer.**

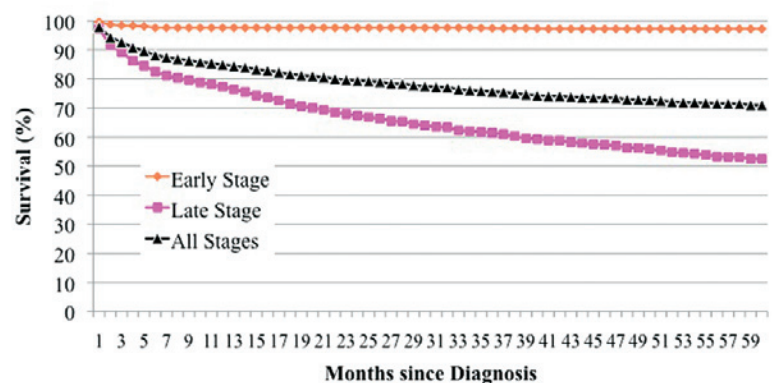


has spread beyond the wall or to nearby lymph nodes (regional stage) or has spread to more distant sites (distant stage). Early stage CRC is associated with an increasing likelihood of survival (Figure 2). For Iowans diagnosed with CRC between 1973 and 2007, 14,300 are still alive today. The number of survivors will increase if the disease is detected earlier.

Research has shown that screening is effective in preventing the development of CRC or detecting invasive disease earlier in its course. CRC begins with small growths called adenomatous polyps. As these polyps grow, they may become cancerous. The United States Preventive Services Task Force, a group of individuals who review evidence about the effectiveness of screening, recommends screening for CRC in adults at average risk between ages 50 and 75 years by any of the following tests: 1) annual sensitive fecal occult blood tests, 2) flexible sigmoidoscopy every 5 years combined with high-sensitivity fecal occult blood testing every 3 years, and 3) screening colonoscopy at intervals of 10 years. Each of these three regimens has been shown to be equally effective in terms of prolonging life, assuming perfect adherence to the regimen. Thus, adherence to the recommended frequency of testing is more important than the specific test chosen. If a test is positive or abnormal, a colonoscopy will be done to make sure that there are no premalignant polyps or if there are, that these are removed. The United States Preventive Services Task Force recommends discontinuing screening at age 75, unless there are individual reasons to do so. Newer tests for CRC screening are coming out. To date, other tests for screening such as the fecal DNA test and computerized tomographic colonography (CTC) have not been shown to reduce deaths from CRC. You should talk with your doctor if you have questions about specific tests.

For screening options, most Iowans have been choosing the stool blood test or sigmoidoscopy/colonoscopy. The Iowa Department of Public

**Figure 2. Colorectal Cancer 5-year Relative Survival by Stage, Iowa, Diagnosed 2001-2002**



Screening can explain the declining colorectal incidence and mortality rates being observed in Iowa. However, there are still significant numbers of Iowans who have not been screened at recommended intervals.

Health has been tracking use of these screening options among the Iowa population for several years. Between 1999 and 2008, the percent of the Iowa population reporting ever having had a sigmoidoscopy or colonoscopy increased substantially in males and females and by age as presented in Figure 3a. During this same time period, the use of the blood stool test decreased in each of these categories (Figure 3b).

Risk factors for CRC other than age and race include a personal history of CRC, polyps, or chronic inflammatory bowel disease; a family history of CRC or polyps in one or more first-degree relatives (a parent, brother, sister, son or daughter); or a family history of a hereditary CRC syndrome. Screening should be considered earlier than age 50 for people with any of these risk factors. In addition, lifestyle factors can increase the risk of CRC. These factors include diets high in fat and calories and low in fiber, physical inactivity, obesity, smoking, heavy alcohol use, and type 2 diabetes.

Despite the benefits and availability of screening, there remain substantial portions of Iowans who have never had any screening exam for CRC. The Iowa Cancer Consortium (ICC) coordinates the collaborative efforts of hundreds of individuals and organizations who work together to conquer cancer. The ICC and its member organizations are active in providing CRC screening education, reducing barriers to CRC screening, enrolling CRC patients into clinical trials to treat this disease with the most appropriate therapy, assuring that the quality of life for every CRC survivor is the best it can be, and conducting research to further reduce the incidence and mortality rates for CRC and move these research findings into prevention, treatment, and control practices.

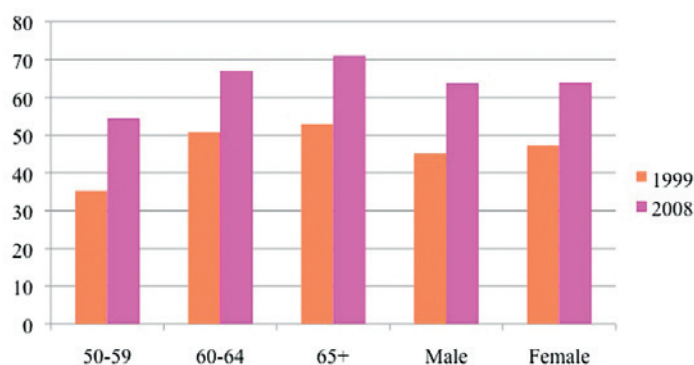
A few examples of specific activities led by the University of Iowa, the ICC, and/or the Iowa Department of Public Health are as follows:

Researchers for a currently funded grant at the University of Iowa are seeking input from Iowans about how best to promote CRC screening, since this is a curable cancer if detected early. The grant funds five Community Assistants who will hold “town hall” type meetings with their constituents across Iowa to find out how to get information out on CRC screening.

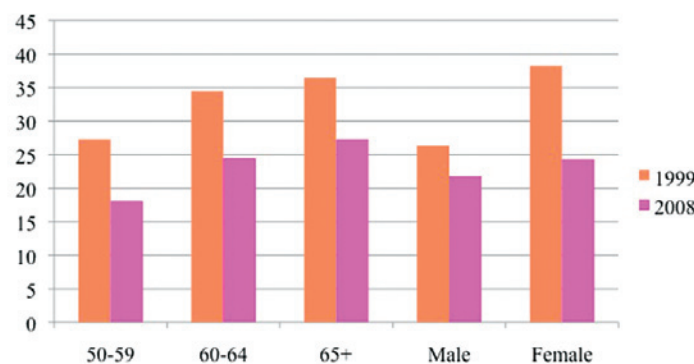
The ICC collaborated with the Iowa Foundation for Medical Care and the American Cancer Society to provide several hundred stool blood test kits along with educational materials to Iowans over 50 year of age to increase screening rates. In addition, health providers received fact sheets on how to talk to patients about CRC screening options.

The ICC provides an annually updated map at [www.canceriowa.org/Iowa-Get-Screened-Map.aspx/](http://www.canceriowa.org/Iowa-Get-Screened-Map.aspx/) that identifies free and reduced-cost CRC screening locations. The Iowa Department of Public Health created and distributed three separate CRC screening campaigns in the past few years directed at rural Iowans, African Americans, and a campaign in Spanish targeted toward the Latino/Hispanic community.

**Figure 3a. Percent of Iowa Population Who have Ever had a Sigmoidoscopy or Colonoscopy by Age Group and Gender**



**Figure 3b. Percent of Iowa Population Who had a Blood Stool Test within the Past Two Years by Age Group and Gender**



Source: <http://apps.nccd.cdc.gov/brfss/>

The Iowa Department of Public Health funded a health care provider education/persuasion campaign to help primary care providers in Iowa talk to their patients about the importance of CRC screening.

The ICC is a collaboration of individuals and organizations from across Iowa, and would not be able to implement its plan or mission without the active involvement of its members. You can join this effort. For more information contact the ICC:

Phone: 1-800-237-1225 or 319-335-8144

Email: [info@canceriowa.org](mailto:info@canceriowa.org)

Internet: [www.CancerIowa.org](http://www.CancerIowa.org)

## Research Projects During 2011

The State Health Registry of Iowa is participating in over three dozen funded studies during 2011. Brief descriptions of a few of these studies are provided.

### AGRICULTURAL HEALTH STUDY

The Agricultural Health Study is a long-term study of agricultural exposures (including pesticides) and chronic disease (especially cancer) among commercial or private pesticide applicators (and their spouses, if married) in Iowa and North Carolina. The study is funded through the National Cancer Institute and involves several federal agencies. We are in the 19th year of the study.

In the first five years, 89,658 subjects (58,564 in Iowa and 31,094 in North Carolina) were enrolled in the study. This total for Iowa included 31,877 private applicators, 21,771 spouses of private applicators, and 4,916 commercial applicators. Enrollment consisted of completing questionnaires about past exposures and health. The second phase of the study for private applicators and their spouses was completed at the end of 2003. It involved a telephone interview, a mailed dietary questionnaire, and collection of a cheek cell sample from all consenting cohort members. The telephone interview asked about pesticide use since enrollment, current farming and work practices, and health changes. The dietary health questionnaire asked about cooking practices and types of foods eaten. Cooking practices and diet may play a role in cancer and other health conditions. The cheek cells are being used to understand possible links between genetics, exposures, and disease. For commercial applicators, the second phase of the study was completed at the end of 2005. The study's third phase began in 2005 and ended in 2010. It involved updating information about exposures and health. Plans for a fourth phase of the study are being developed.

Since 1997, cohort members have been linked annually to mortality and cancer registry incidence

databases in both states. In addition, mortality data on the cohort are being obtained from the National Death Index. More information about results from this study, the study background, frequently asked questions, other resources (internet & telephone) for agricultural health information, references for publications to date, and information for scientific collaborators can be found at the website, [www.aghealth.org](http://www.aghealth.org). The titles for over 100 publications from this study linked to PubMed are available at the website. The cancer-related references for 2010 publications are provided in the last section of this report.

### GEOGRAPHIC INFORMATION SYSTEMS

The State Health Registry of Iowa is involved with research utilizing geographic information systems to develop and test methodologies to identify regions of excess cancer burden in Iowa. Geographic information systems are refining measures of geographic access to cancer prevention, treatment and screening services in Iowa by using fine-scaled geographic data on individuals, the spatial choices of individuals, and the locations of service providers. Results can be used to plan more appropriate cancer prevention and control programs.

The Registry has been mostly involved with this for the four major cancers in Iowa. One activity has been to create maps for use by the Iowa Cancer Consortium to assist with planning for cancer prevention and control. These maps were created under the direction of Dr. Gerard Rushton, Professor of Geography at the University of Iowa, and his graduate students. Examples can be viewed at <http://www.canceriowa.org/News---Publications/GIS-Smoothed-Cancer-Maps-of-Iowa.aspx>. The references for a couple of recent publications involving geographic information systems are provided in the last section of this report.

### IOWA WOMEN'S HEALTH STUDY

This is a population-based cohort of 41,837 Iowa women, aged 55-69 in 1986, who were recruited to determine whether diet, body fat distribution and

other risk factors were related to cancer incidence. Exposure and lifestyle information was collected in a baseline mailed survey and subsequently in several follow-up mailed surveys. Mortality and cancer incidence have been ascertained since 1986 through annual linkage to the State Health Registry of Iowa databases and the National Death Index. In 2010 the study was refunded for its 25th through 29th years. The project has been extremely productive with over 200 publications, some of which occurred in 2010 and are listed in the references provided in the last section of this report.

### **NON-HODGKIN LYMPHOMA (NHL) CASE-CONTROL STUDY**

The State Health Registry of Iowa with other investigators at the Mayo Clinic participated in a collaborative, population-based case-control study of NHL involving researchers at the National Cancer Institute and three other Surveillance, Epidemiology, and End Results (SEER) registries. The main objective of the study was to better characterize risk factors for NHL. In Iowa, 364 live patients newly diagnosed with NHL between July 1, 1998 and June 30, 2000 were enrolled. A similar number of population controls participated. Blood samples were sought from study participants. The State Health Registry of Iowa also coordinated the acquisition of pathology reports, slides and tissue blocks from all SEER centers. The slides were reviewed to determine the reliability of NHL pathologic classification. More recently, we are collaborating with researchers at the Mayo Clinic to investigate whether genes with functional, common variant polymorphisms involved in immune function and regulation are associated with overall survival from NHL among these patients. To achieve this aim, medical record reviews were performed to obtain more detailed information on the treatment received for NHL. These research activities resulted in several publications during 2010. The references for these are provided in the last section of this report.

### **PATTERNS OF CARE STUDIES**

SEER Patterns of Care Studies are conducted to satisfy a U.S. Congressional directive to the National Cancer Institute to “assess the incorporation of state-of-the-art cancer treatment into clinical practice and the extent to which cancer patients receive such treatments and include the results in such assessment in the biennial reports.” This year’s Patterns of Care Study will involve urinary bladder, head and neck, pancreas, and kidney cancers in adults diagnosed between January 1, 2009 and December 31, 2009. The objectives of the SEER Patterns of Care Study are to: 1) describe the use of adjuvant therapy, which has been verified with the treating physician, in a community setting, 2) characterize the practice patterns in different communities, 3) describe more completely the use of surgery in the treatment of specific cancers, 4) compare the patterns of treatment for cancer over time, 5) compare patterns of care by age and race/ethnicity, 6) describe effect of co-morbid conditions on treatment, and 7) describe treatment by hospital characteristics: i.e. for profit vs. not for profit, teaching vs. non-teaching, disproportionate share status, etc. The SHRI has been involved with these types of studies over the past 20 years. During 2010, they have resulted in a few publications, which are provided in the last section of this report.

### **POOLED ANALYSES**

Today, researchers are increasingly looking to combine their study data with data from other studies evaluating similar outcomes. Several studies that involve the State Health Registry of Iowa have had their data contributed for this pooling research including the Agricultural Health Study, the Iowa Women’s Health Study, the NHL Case-Control Study, and the American Cancer Society’s Cancer Prevention Study II Nutrition Cohort. During 2010, these activities addressed cancer risk associated with common lifestyle and/or genetic susceptibility factors and resulted in several publications.



## **TRANSPLANT CANCER MATCH STUDY**

Solid organ transplantation provides life-saving treatment for end-stage organ disease but is associated with substantially elevated cancer risk, largely due to the need to maintain long-term immunosuppression. Important questions remain concerning the role of immunosuppression and other factors in causing cancer in this setting. Staff at two federal agencies, the National Cancer Institute and the Health Resources and Services Administration, are creating a database through linkage of information on U.S. transplant recipients (383,444 transplant recipients during 1987-2007), wait list candidates (216,067 candidates during 1987-2007 in addition to those who were subsequently transplanted), and donors (61,430 deceased donors, 57,961 living donors during 1999-2007) with information on cancer from multiple U.S. cancer registries, including the State Health Registry of Iowa. These data are being used to conduct research concerning the spectrum of cancer risk in transplant recipients. The data will also be used by the Health Resources and Services Administration in its public health role overseeing the U.S. solid organ transplant network to maintain and improve safety of organ transplantation, and will allow the National Cancer Institute to better characterize the burden of cancer in this population and discover risk factors for cancer among immunosuppressed individuals.

## **WECARE STUDY**

The WECARE (Women's Environmental Cancer and Radiation Epidemiology) Study is an example of a second cancer study. This study is designed to examine gene carrier status, demographic and lifestyle factors as well as environmental and treatment factors reported to be associated with breast cancer as they relate to the development of a second breast cancer in the opposite breast. Data collection not only involved medical record review, but also participant interviews and blood or buccal (cells from the mouth) sample collection. This year, we are back in the field adding more participants to this study to enable a genome-wide association study to be conducted to learn more

about how genetic, environmental, and lifestyle factors work together to influence whether a woman with breast cancer will develop a second breast cancer in the opposite breast.

Results from the WECARE Study have provided important medical information and will continue to do so in the future. During 2010, findings from this study resulted in a half-dozen publications, the references for which are provided in the last section of this report.

## **SEER-MEDICARE**

In the early 1990s, the cancer incidence and survival data from the State Health Registry of Iowa was combined with other SEER Registry data and linked to Medicare data. This linked data set has been updated on several occasions since and has become an important data resource for cancer research involving epidemiologic and health services research related to the diagnosis, treatment and procedures, costs, and survival of cancer patients. Over the years many publications have resulted from this linked data set including several during 2010, which are listed at <http://healthservices.cancer.gov/seermedicare/overview/publications.html>.

## **COOPERATIVE AGREEMENTS AND OTHER REGISTRIES**

The State Health Registry of Iowa maintains cooperative agreements with several hospital cancer registries and other agencies/entities. Some of the latter include:

- Iowa Department of Public Health
- Iowa Cancer Consortium
- The University of Iowa
  - Center for Health Effects of Environmental Contamination
  - Center for Public Health Statistics
  - Environmental Health Sciences Research Center
  - Health Effectiveness Research Center
  - Holden Comprehensive Cancer Center
  - Iowa Center for Agricultural Safety and Health
  - Injury Prevention Research Center
  - Preventive Intervention Center
  - Reproductive Molecular Epidemiology Research & Education Program

## Selected 2010 Publications

### AGRICULTURAL HEALTH STUDY

1. Andreotti, G., Hou, L., Beane Freeman, L. E., Mahajan, R., Koutros, S., Coble, J., Lubin, J., Blair, A., Hoppin, J. A., and Alavanja, M. Body mass index, agricultural pesticide use, and cancer incidence in the Agricultural Health Study cohort. *Cancer Causes Control*, 21: 1759-75, 2010.
2. Bonner, M. R., Williams, B. A., Rusiecki, J. A., Blair, A., Beane Freeman, L. E., Hoppin, J. A., Dosemeci, M., Lubin, J., Sandler, D. P., and Alavanja, M. C. Occupational exposure to terbufos and the incidence of cancer in the Agricultural Health Study. *Cancer Causes Control*, 21: 871-7, 2010.
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